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# ABSTRACT

5 A method of probing voltage comprises: establishing electrical connectivity between a conductor to be probed and a first terminal of a photoconductive switch; during a sampling interval  $n$ , applying a laser pulse to the photoconductive switch while applying a voltage to a second terminal of the photoconductive switch corresponding to a voltage sample taken during a prior sampling interval  $n-1$ , such that current flow through the photoconductive switch is dependent on any difference between voltage of the conductor and the applied voltage; converting the current flow to a voltage signal; passing the voltage signal during a gating interval, and sampling the passed voltage signal to produce a voltage sample for the sampling interval  $n$ . A repetitive test pattern applied to the conductor and the sampling interval is synchronized with the repetitive test pattern. Converting the current flow to a voltage signal can comprise applying the current flow to a current-to-voltage converter having a rise time which is less than the gating interval.

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15 The voltage signal can be passed only during the gating interval so that the voltage sample is insensitive to any leakage through the photoconductive switch outside of the gating interval. Passing the voltage signal during a gating interval can comprise applying the voltage signal to a first transistor Q1 of a differential pair of transistors Q1, Q2, applying a reference voltage to a second transistor Q2 of the differential pair of

20 transistors, and controlling common emitter current of the differential pair of transistors with an electronic switch so as to pass the voltage signal when the electronic switch is closed. Sampling the voltage signal can comprises applying the voltage signal to an analog-to-digital converter and enabling the analog-to-digital converter to prepare a digital sample of the voltage signal representing voltage on the conductor. Apparatus for

25 carrying out the method is also provided.